

CLAIMS

1. A method for preparing polyolefins having a ratio of internal to terminal double bonds of at least 1:1 by polymerising an olefin monomer in the presence of a catalyst component having formula (1):



wherein Cp is a cyclopentadienyl group having at least one substituent that is positioned distal to the bridge; Cp' is an unsubstituted or 3 - and/or 6 - substituted fluorenyl group; R'' is a structural bridge imparting stereorigidity to the catalyst; M is a metal atom from Group IVB, VB or VIB; and each Q is a hydrocarbyl group having from 1 to 20 carbon atoms and p is the valance of M minus 2;

under polymerising conditions to form a polyolefin characterised in that the olefin monomer is present at a concentration of less than 3 M/L, and polymerisation is carried out at a temperature in the range of from 20 to 90°C so that the formed polyolefin has a ratio of internal to terminal double bonds of at least 1:1.

2. The method of claim 1 wherein the cyclopentadienyl has a bulky substituent in a position distal to the bridgehead position.
3. The method of claim 2 wherein the distal substituent on Cp is selected from n - Pr, i-Pr, n-Bu, t-Bu or Me₃Si.
4. The method of any one of claims 1 to 3 wherein the fluorenyl is unsubstituted.
5. The method of any one of claims 1 to 3 wherein the fluorenyl is symmetrically substituted.
6. The method according to any one of claims 1 to 5, wherein the catalyst component is activated by a boron -containing activating agent.

7. The method according to any one of claims 1 to 6, wherein the olefin monomer comprises ethylene or propylene.
8. The method according to any one of the preceding claims further comprising the step of forming a non-linear polyolefin.
9. The method according to claim 8, wherein the polyolefin having a ratio of internal to terminal double bonds of at least 1:1 is carried out in a first reaction zone and the production of non-linear polyolefin is carried out in a second reaction zone in series with the first reaction zone.
10. A non-linear polyolefin obtainable according to the method as defined in claim 8 or claim 9.
11. The non-linear polyolefin according to claim 10, having long chain branching.
12. The non-linear polyolefin according to claim 10 or claim 11, that is a cross-linked polyolefin.
13. The method of any one of claims 1 to 7 further comprising the step of forming a functionalised polyolefin by performing an addition reaction at one or more of the double bonds.
14. A functionalised polyolefin obtainable according to the method as defined in claim 13.
15. The method of any one of claims 1 to 7 further comprising the step of forming a polyolefin foam.
16. A polyolefin foam obtainable according to the method as defined in claim 15.